M2TECH

VAUGHAN

384KHZ/32BIT DIGITAL-TO-ANALOG CONVERTER

USER MANUAL

------- PRELIMINARY -------

REV. PRA – 5/2012

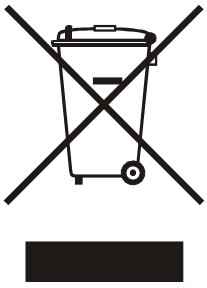
Warning!

Changes or modifications not authorized by the manufacturer can invalidate the compliance to CE regulations and cause the unit to be no more suitable to use. The manufacturer refuses every responsibility regarding damages to people or things due to the use of a unit which has been subject to unauthorized modifications or to misuse or to malfunction of a unit which has been subject to unauthorized modifications.

This unit is compliant with the following CE regulations when an USB cable less than 3m is used: CEI EN 55022:2009 Class B (Radiated Emissions), CEI EN 55024:1999, CEI EN 55024:A2/2003, CEI EN 55024:IS1/2008 (Radio Frequency Electromagnetic Fields, 50Hz Magnetic Field Immunity Test and Electrostatic Discharges – ESD).

For a proper operation of this unit, all connections to other equipment in the system must be done when all equipment are off. Failing to comply to this advice may lead to damage to the unit.

Recycling



The label above, printed on the product case, indicates that the product, when no more usable, can't be treated as generic garbage, but must be disposed of at a collection point for recycling of electrical and electronic equipment, in compliance with the WEEE regulation (Waste of Electrical and Electronic Equipment).
By making sure that this unit is correctly recycled, you will help preventing potential damages to environment and human health, which could be caused by a wrong treatment of this product as generic garbage. Materials recycling helps saving natural resources. For more in-depth information about recycling this product, please contact M2Tech Srl.

WARNING: the information contained in this manual are considered to be reliable and accurate. M2Tech reserves the right to change or modify the information any time, without prior advice. It's up to the customer to ensure that the manual being consulted is the latest version.

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Dear customer,

thank you for purchasing VAUGHAN. What you have is a first-rate digital-to-analog converter with many unique features conceived to obtain the best audio performance out of a music file.

Even if getting music out of a PC or a Mac is nowadays quite simple, much harder is to obtain the best sonic performance from it, due to intrinsic limits in USB 1.1 audio standard and the implementation of digital audio interfaces in computers. Please visit M2TECH website (www.m2tech.biz) to find extensive literature about this topic.

VAUGHAN overcomes all the limits of usual USB digital-to-analog converters by implementing the latest generation HIFACE technology, which uses proprietary drivers and asynchronous data transfer, along with a sophisticated electronic design.

VAUGHAN features a comprehensive set of input connections which suit virtually all digital sources around.

We feel that your expectations will be fulfilled by VAUGHAN: you'll hear your CD's, DVD's and music files in a way like never before, prepare for a whole new experience!

Nadia Marino, CEO

Please annotate here your VAUGHAN serial number for future reference:

S/N: _____

Date of purchase: _____

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1. Unpacking and placing the unit

Place the carton box on a table and open it by removing or cutting the adhesive tape. Extract the foam upper cover. You should find the following items:

- one VAUGHAN DAC;
- one mains cord;
- one A-B USB cable;
- one remote control;
- this manual;
- one pair of gloves.

Should one or more items be missing, please contact your dealer or local distributor.

Extract the VAUGHAN from the foam container and place it on a stable base, far from heat sources. Avoid the direct sunlight on the unit. Allow for enough room around the unit for venting. The VAUGHAN is a high efficiency design so little heat is produced during normal operation; anyway, it's better allow for adequate venting. Avoid smoke, humidity, moisture and water from reaching the unit.
Do not place the unit on thick carpets or inside a box or piece of furniture, or in close contact with curtains.

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2. Front Panel

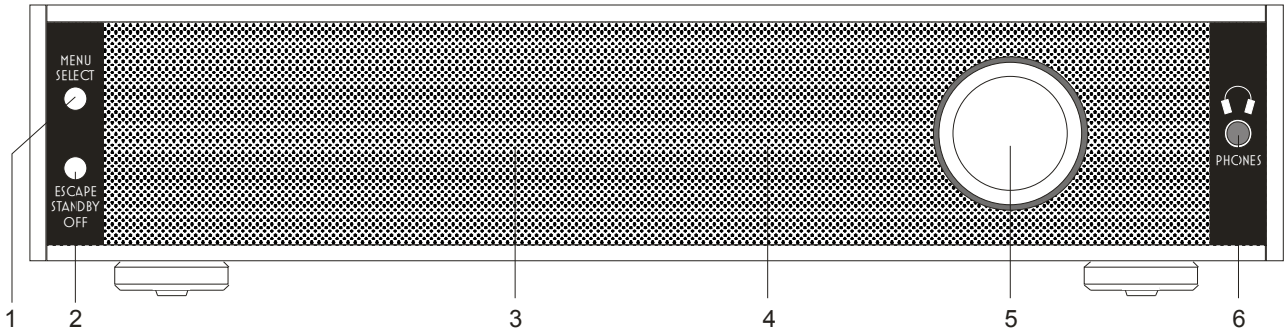

Figure 1

1) Menu/select button. It is used to access the menu and to select a menu option.

2) Escape/standby/off button. It is used to abort a choice in the menu, to put the unit in standby and to switch the unit off.

3) Left display. Displays the selected input or the menu item.

4) Right display. Displays sampling frequency or the value for the menu item.

5) Encoder. It is used to set the volume or to scan through menu items values.

6) Headphones output. Connect a headphone jack to this output. 6.35mm (1/4”) stereo socket.

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3. Back Panel

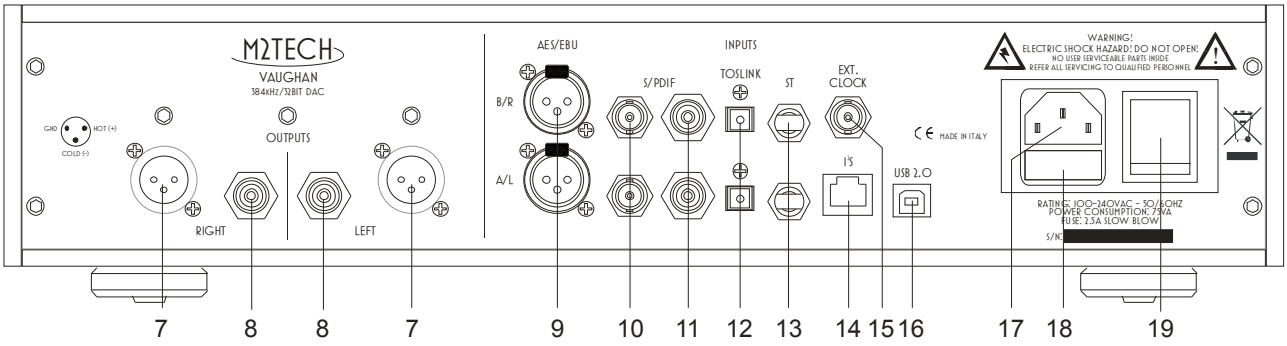

Figure 2

7) Balanced analog outputs. Connect to a left-right pair of balanced inputs of the amplifier or preamplifier. XLR male connectors.

8) Single-ended analog outputs. Connect to a left-right pair of single-ended inputs of the amplifier or preamplifier. RCA female connector.

9) AES/EBU digital inputs. Accepts AES/EBU datastreams in either professional or consumer format. Can be configured as two stereo inputs or one dual-mono input. XLR female connector.

10) S/PDIF BNC digital inputs. Accept S/PDIF datastreams. Can be configured as two stereo inputs or one dual-mono input. True 75 Ohms BNC female connectors

11) S/PDIF RCA digital inputs. Accept S/PDIF datastreams. Can be configured as two stereo inputs or one dual-mono input. RCA female connectors

12) Toslink™ optical digital input. Optical input for Toslink™ cables. Can be configured as two stereo inputs or one dual-mono input. Toslink™ connector.

13) ST™ optical digital input. Optical input for ST™ cables. Can be configured as two stereo inputs or one dual-mono input. ST™ connector.

14) I^2S input. Accepts I2S audio signals. RJ45 8-pole female connector with M2TECH proprietary pinout (see Section 12 on Page 26).

15) External clock input. Accepts both master clocks and word clocks with automatic detection (see Section 13 on Page 26). True 75 Ohm BNC female connector.

16) USB 2.0 input. Connect to a PC or MacIntosh with an USB 2.0 compliant A-B cable. USB 2.0 B female connector.

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17) IEC mains input. Connect the power cord provided with the unit or any other power cord provided with IEC 3-prong female connector.

18) Fuse holder. Contains two 2A thermal 5x20mm fuses. One is in service while the other is for spare.

19) Power Switch. It's a temporary (monostable) rocker switch. It automatically reverts to the off position after the user release it. Operate it for a few seconds to switch the unit on. (see Section 5 on Page 10).

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4. Remote Control

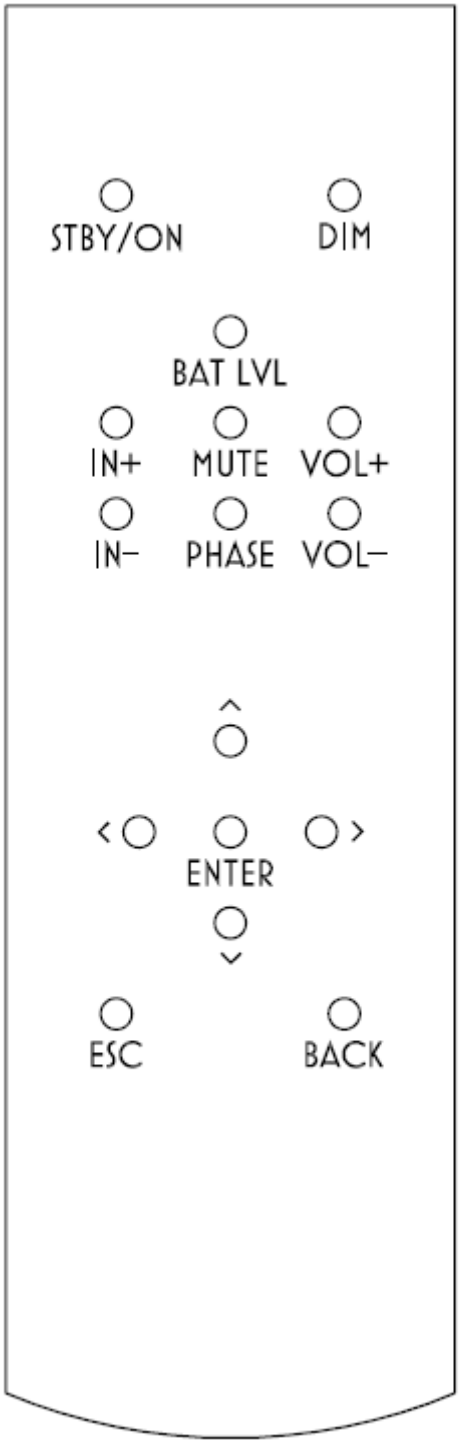

Figure 3

Stby/On. Activates the unit when it's in standby and puts it in standby when it's on.

Dim. .Allows for choosing 6 different intensity levels for the display, plus an "auto" mode in which the display is always off, except for a few seconds after a command is sent to the unit.

Bat Lvl. Displays the battery status on the display.

In+ and **In-.** Allow for sequentially choose the input.

Mute. Toggles mute on and off. Mute is 20dB attenuation over the set volume level.

Phase. Toggles output signal phase between 0° and 180°. Useful to restore absolute phase of certain recordings made with inverted phase

Vol+ and **Vol-.** Allow for setting the volume, except when the volume control is disabled.

Arrows and **Enter.** Allow for navigating the menu.

Esc. Exits the menu without changing the displayed option.

Back. Recalls the active value of the displayed option.

Note: the remote control is powered by two AAA type batteries. To replace them, unscrew the screw that holds the bottom cover and open it by sliding it to the back. Please pay attention: when the bottom cover is extracted, the front grill may fall down.

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5. Connecting and powering the unit

ADVICE: all connections to other equipment in the system must be done when all equipment are off. Failing to comply to this advice may expose the VAUGHAN to the risk of damages.

Please refer to section 3, “Back Panel Description”.

Connect the “B” plug of a 2.0 USB A-B cable to the USB connector (Figure 2, 16) of the VAUGHAN.

Connect the “A” plug of the cable to a 2.0 USB port of your computer.

Connect two interconnects to the balanced or single-ended analog outputs of the VAUGHAN (Figure 2, 7/8) and to the input of your amplifier/preamplifier.

Connect digital cables from your digital sources (CD player, DAT tape recorder, DAB/DVB/sat tuner) to the VAUGHAN’s digital inputs (Figure 2, 9-14).

If needed, connect a clock generator to the external clock input (Figure 2, 15).

Connect the power cord to the supply connector (Figure 2, 17) of the VAUGHAN. Then, connect the mains plug of the power cord to the wall outlet.

Now, operate the mains switch (Figure 2, 19) for a couple of seconds to activate the unit. **After releasing it, it will revert to the off position: this is a normal and desired behaviour. In fact, after the initial operation by the user, necessary to activate the unit, The VAUGHAN will take control of the mains supply.**

If the selected input is “USB” and a driver hasn’t been installed on your computer, an automatic driver installation wizard may appear.

Note: If you want to avoid the automatic driver installation, please connect the VAUGHAN to the computer after manually installing the driver (see Section 6.2.2).

5.1. Standby and power off

Once the VAUGHAN is active, it’s possible to put it in standby pressing the “Escape/Standby/off” button on the front panel for two seconds or the “Stby” button on the remote control. The unit enters a low consumption mode and eventually starts a battery charge. The unit can be reactivated by pressing the “Escape/Standby/off” button again. While entering the standby, the unit stores its working configuration in its non-volatile memory.

When a long idle period if planned, to avoid wasting battery charge cycles it’s wise to completely switch the unit off. This is allowed by pressing the “Escape/Standby/off” for at

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least four seconds. This way the battery is totally isolated. To switch the unit on again its is necessary to operate the rear panel rocker switch (Figure 2, 19, Page 7).

For continuous or nearly continuous operation, it is recommended to set the power mode in “Auto” (Section 16.3, page 31), to ensure the longest life possible to the battery.

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6. Driver installation

6.1. Obtaining the driver

The drivers for the VAUGHAN are the same as the Young's and are available on the M2TECH website, in the download page (www.m2tech.biz/download.asp). Download the driver you need for your computer and operating system. Windows drivers are contained in zip files, Mac drivers are contained in dmg files encapsulated in zip files.

6.2. Installing the driver on a Windows-based PC

Create a temporary folder in the hard disk of your computer (you can even create it on the desktop). Then, double-click on the zip file to open it. Select and drag all files in the temporary folder: this automatically unzips all files.

6.2.1. Automatic (guided) installation

Activate the VAUGHAN, select the USB input and connect it to the PC. Following the negotiation process, the driver installation wizard is automatically launched. Select the option "Not now", as in Figure 4.

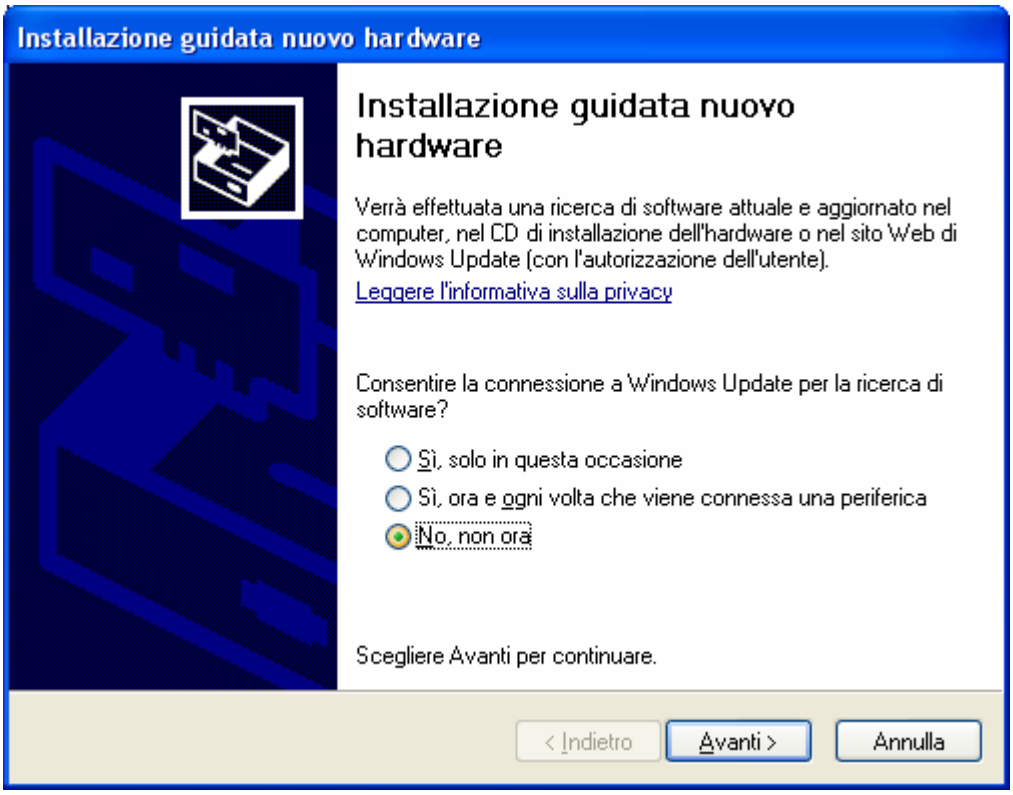
Installazione guidata nuovo hardware
Installazione guidata nuovo hardware
Verrà effettuata una ricerca di software attuale e aggiornato nel computer, nel CD di installazione dell'hardware o nel sito Web di Windows Update (con l'autorizzazione dell'utente).
Leggere l'informativa sulla privacy
Consentire la connessione a Windows Update per la ricerca di software?
Sì, solo in questa occasione
Sì, ora e ogni volta che viene connessa una periferica
No, non ora
Scegliere Avanti per continuare.
< Indietro
Avanti >
Annulla

Figure 4

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Click on the button to proceed. A window appears as shown in figure 5:

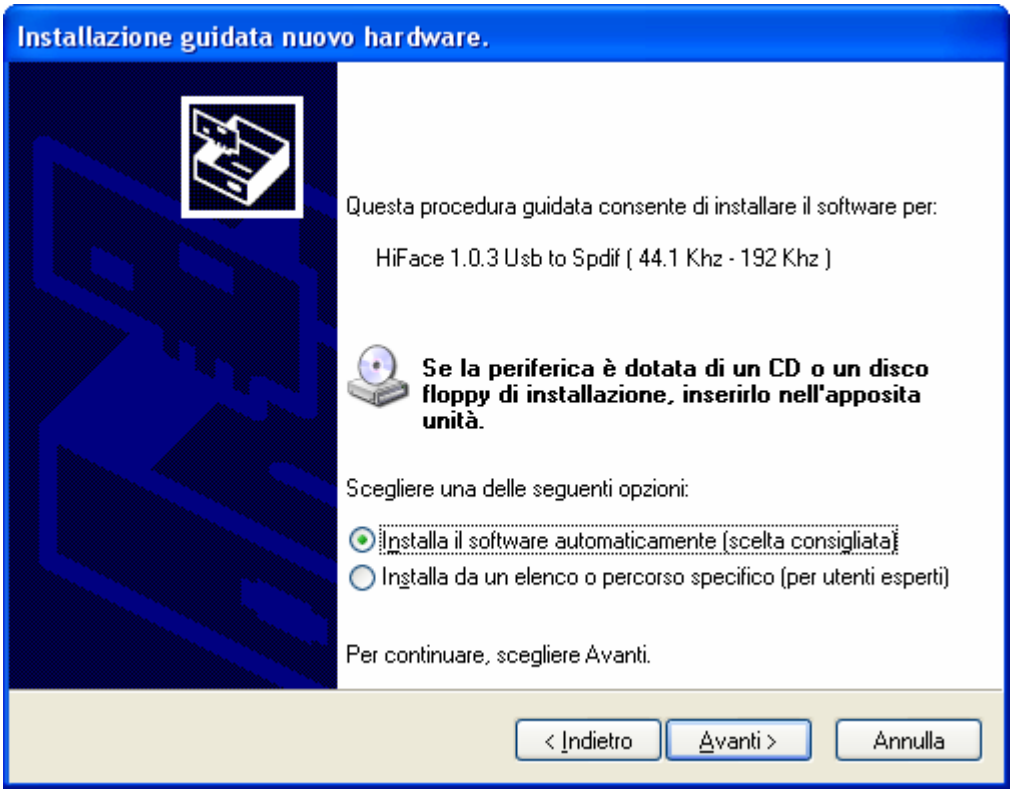
Installazione guidata nuovo hardware.
Questa procedura guidata consente di installare il software per:
HiFace 1.0.3 Usb to Spdif (44.1 Khz - 192 Khz)
Se la periferica è dotata di un CD o un disco floppy di installazione, inserirlo nell'apposita unità.
Scegliere una delle seguenti opzioni:
Installa il software automaticamente (scelta consigliata)
Installa da un elenco o percorso specifico (per utenti esperti)
Per continuare, scegliere Avanti.
< Indietro
Avanti >
Annulla

Figure 5

Choose automatic installation (as recommended) and proceed to next step. Indicate the folder where you have previously unzipped the driver and proceed to installation. The window shown in figure 6 will appear:

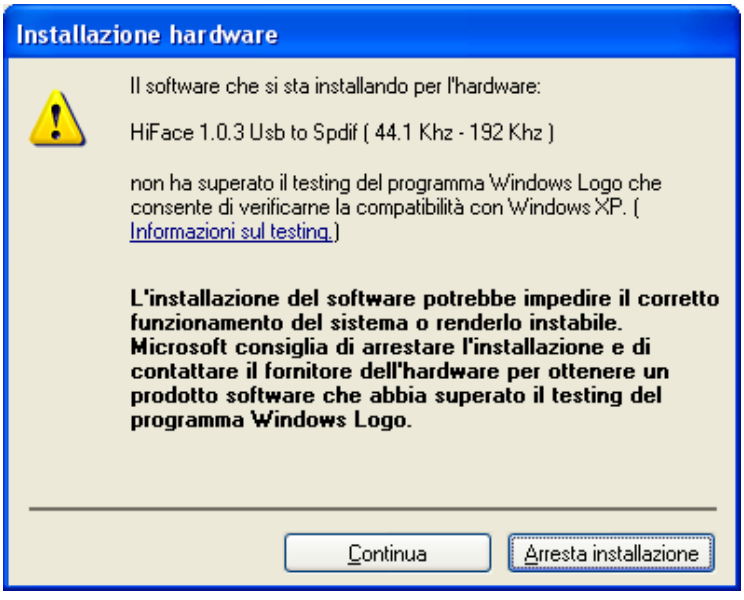
Installazione hardware
Il software che si sta installando per l'hardware:
HiFace 1.0.3 Usb to Spdif (44.1 Khz - 192 Khz)
non ha superato il testing del programma Windows Logo che consente di verificarne la compatibilità con Windows XP. (Informazioni sul testing.)
L'installazione del software potrebbe impedire il corretto funzionamento del sistema o renderlo instabile. Microsoft consiglia di arrestare l'installazione e di contattare il fornitore dell'hardware per ottenere un prodotto software che abbia superato il testing del programma Windows Logo.
Continua
Arresta installazione

Figure 6

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Click on Continue. The installation will proceed to the end. The window shown in figure 7 will appear. Click on Finish to complete the driver installation.

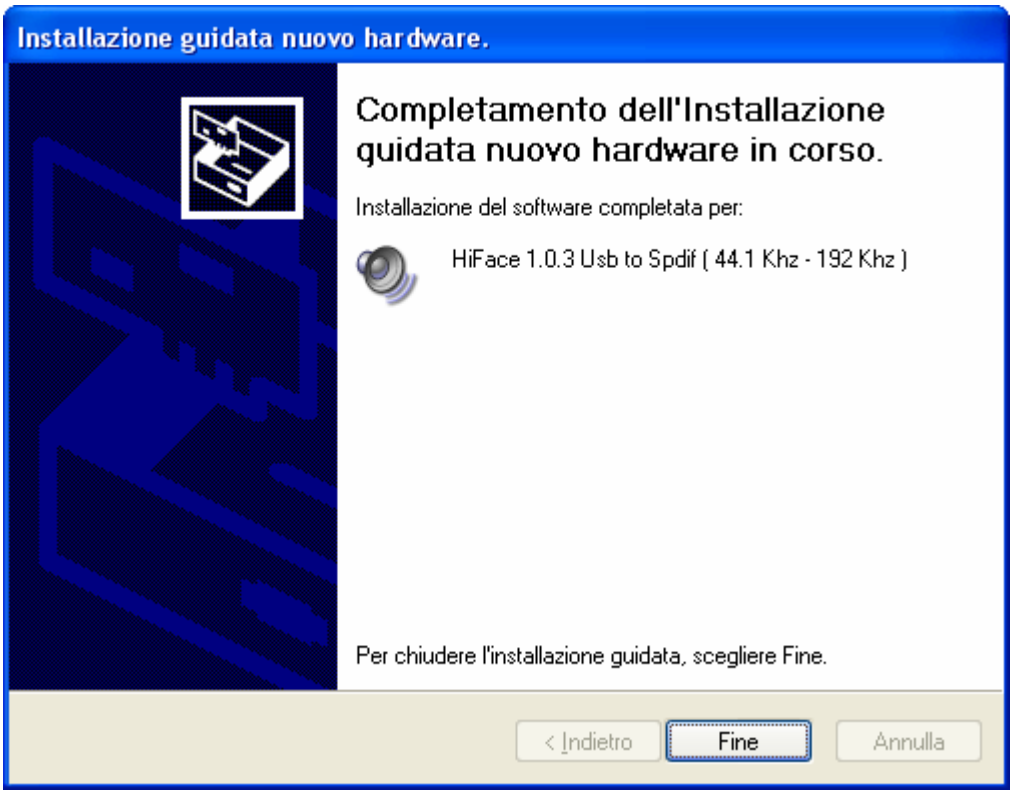
Installazione guidata nuovo hardware.
Completamento dell'Installazione guidata nuovo hardware in corso.
Installazione del software completata per:
HiFace 1.0.3 Usb to Spdif (44.1 Khz - 192 Khz)
Per chiudere l'installazione guidata, scegliere Fine.
< Indietro
Fine
Annulla

Figure 7

Note: the wizard appearance and the guided installation procedure may slightly vary from XP to Vista to Windows 7.

6.2.2. Manual installation

Sometimes it's necessary or advisable to install the driver manually. The installation package offers two installation utilities, "setup32.exe" and "setup64.exe". The former is for 32 bits operating systems, while the latter is for 64 bits operating systems. Without connecting the VAUGHAN to the PC, double-click on either "setup64.exe" or "setup32.exe", depending on your operating system: the driver will be installed in your PC.

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6.3. Installing the driver on a Mac

Double-click on the zip file to open it. It contains a single dmg file. Extract it from the zip and double-click on it to open it. It only contains a pkg file. Double click on it to start driver installation. The window shown in figure 8 will appear.

Figure 8

Click on the Continue button. The installation process will go on and the window in figure 9 will appear.

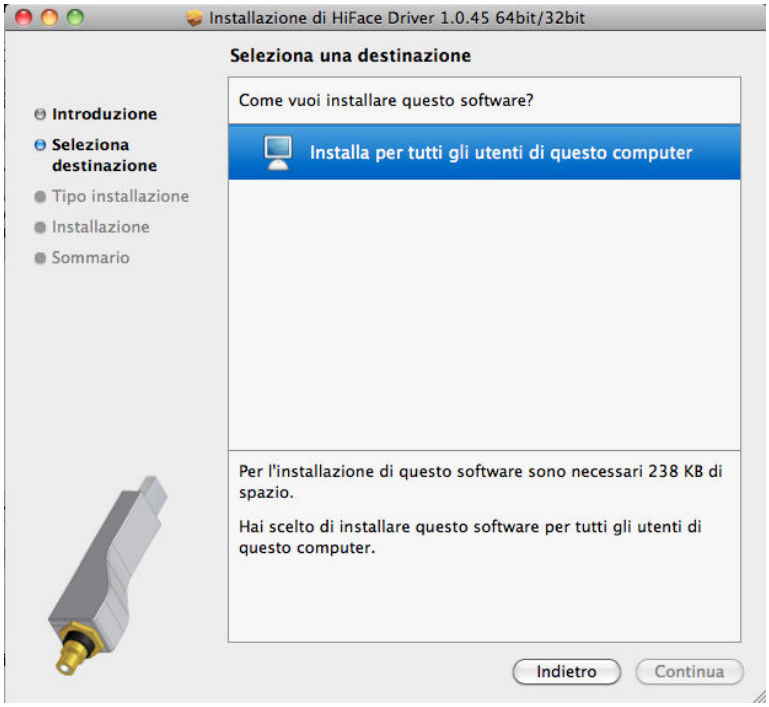
Installazione di HiFace Driver 1.0.45 64bit/32bit
Seleziona una destinazione
Introduzione
Seleziona destinazione
Tipo installazione
Installazione
Sommario
Come vuoi installare questo software?
Installa per tutti gli utenti di questo computer
Per l'installazione di questo software sono necessari 238 KB di spazio.
Hai scelto di installare questo software per tutti gli utenti di questo computer.
Indietro
Continua

Figure 9

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Select “Install for all users”, then click on Continue button. Another window will appear as in figure 10 and you’ll be asked to type in the administrator password. After doing that, the installation process will continue and you’ll be asked for a confirmation to continue the process up to the computer restart. Click on Continue Installation button.
The installation will continue until the final window will appear, announcing the successful installation of the driver.

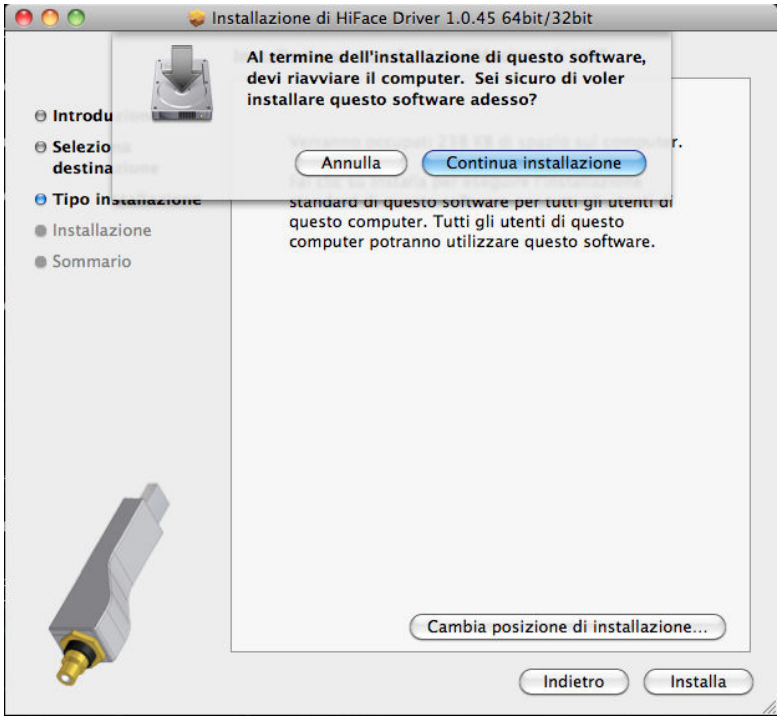

Figure 10

Click on Restart button to complete the installation process as indicated in figure 11.

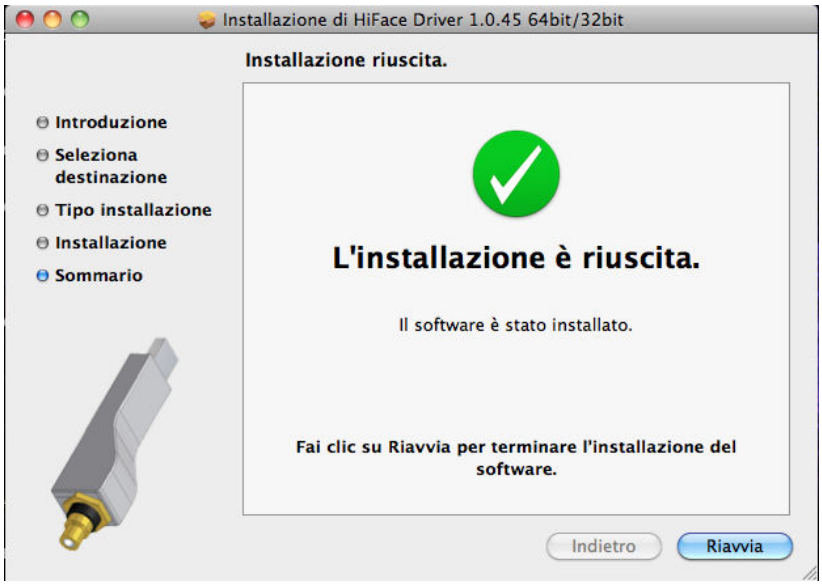

Figure 11

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6.4. Unistalling the driver

Sometimes it is necessary to uninstall the driver to roll back to a previous version. Uninstall is a quite simple procedure which depends on the operating system and the way the driver was installed.

6.4.1. Uninstalling the driver on a Windows-based PC after installation with setup32.exe or setup64.exe

Go to the control panel and launch the “Application Installation” utility.
Look for the VAUGHAN driver item in the list.
Double-click on it to launch uninstalling.

6.4.2. Manually uninstalling the driver on a Windows-based PC

Connect the VAUGHAN to the PC and select the USB input.
Go to the control panel and launch the “System” utility, then select Hardware tab. Open the Peripehral Management window (see figure 12).
You’ll find Young listed under Audio, Video and Game controllers.

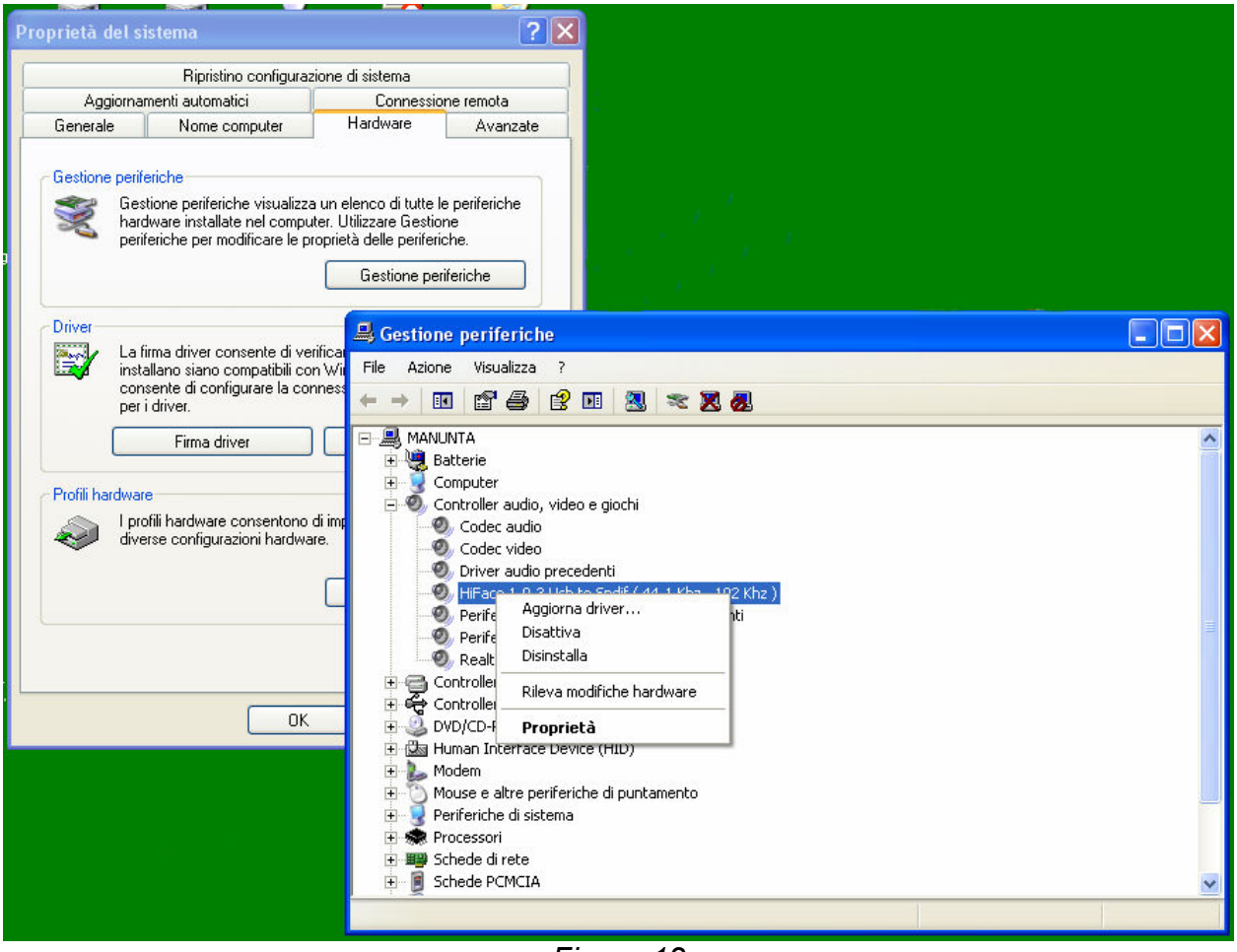

Figure 12

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Right-click to access the available actions.
Select “Uninstall”.

6.4.3. Uninstalling the driver on a Mac

Open a console, then type the following commands:

```
sudo mv /System/Library/Extensions/Young.kext /tmp
sudo touch /System/Library/Extensions
sudo pkgutil --forget com.m2tech.driver
```

Then, restart the Mac.

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7. Configuring the computer to use the VAUGHAN

7.1. Configuring a PC with Windows XP

A PC with Windows XP can use the VAUGHAN in two different ways: Direct Sound (DS) and Kernel Streaming (KS). The former is suitable for players which can't operate in Kernel Streaming mode (such as Windows Media Player and iTunes) or for Internet streaming, while the latter can be chosen (for better performance) with players which can operate in Kernel Streaming mode (such as FooBar, Winamp, Monkey Media, JRiver).

7.1.1. Configuring for Direct Sound with Windows XP

Connect the VAUGHAN to your PC and select the USB input. Then, go to the Control Panel and launch the Sound and Audio Peripherals utility.
Select the Audio tab. In the Predefined Peripheral drop-down menu of the Playback area, select "KS M2Tech 384/32 DAC" (see figure 13).

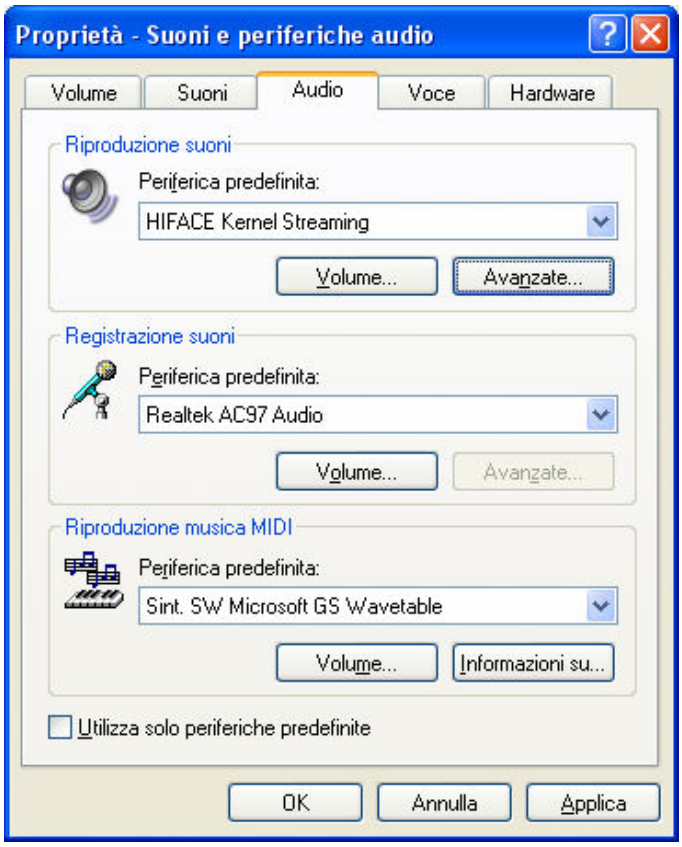

Figure 13

Then, select the "Voice" Tab. Again, select "Young Kernel Streaming" in the drop-down menu of the Playback area. Click on OK button. Please be adviced that even if the

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peripheral is listed as “kernel streaming”, it will operate in Direct Sound mode when listed here.
From now on, unless the VAUGHAN is disconnected or settings are changed again, VAUGHAN is the audio peripheral all audio programs will use when operating in direct sound mode.

7.1.2. Configuring for Kernel Streaming with Windows XP

Kernel Streaming has no standard setting in Windows XP. KS must be selected in the specific player you choose to use.
For example, when using FooBar, with VAUGHAN connected to the PC and USB input selected, go to the File/Preferences/Playback /Output tab and select “KS: M2Tech 384/32 DAC” as output device. Other players will require different settings (see section 8).

7.1.3. Using VAUGHAN in both Kernel Streaming and Direct Sound mode.

When VAUGHAN is selected as predefined audio peripheral, it’s possible to use it in Kernel Streaming mode, too, with a caveat. When using it in KS mode, it is necessary that no other application accesses the VAUGHAN in DS mode. If this happens, Windows XP’s Kernel Mixer takes control of VAUGHAN’s driver and from then on, no KS application can access the VAUGHAN unless the PC is restarted or the VAUGHAN connection to the PC is cycled or another input is selected on the VAUGHAN, then returning on the USB input.

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7.2. Configuring a PC with Windows Vista or Windows 7

A PC with Windows Vista or Windows 7 can use the VAUGHAN in three different ways: Direct Sound (DS), Kernel Streaming (KS) and WASAPI. DS is suitable for players which can't operate in Kernel Streaming mode nor with WASAPI or for Internet streaming; KS can be chosen (for better performance) with players which can operate in Kernel Streaming mode (such as FooBar, Winamp, Monkey Media, JRiver). WASAPI (Windows Audio Standard API) is a standard interface for audio players which allows to get the same performance of KS with applications which can't operate in KS mode, at the cost of higher CPU load.

7.2.1. Configuring for Direct Sound with Windows Vista or Windows 7

Open control Panel and select Hardware and Sounds. Under Audio, click on Manage Audio Devices. The following windows will appear, in which Young is listed. Set Young as predefined device. Then, click on OK.

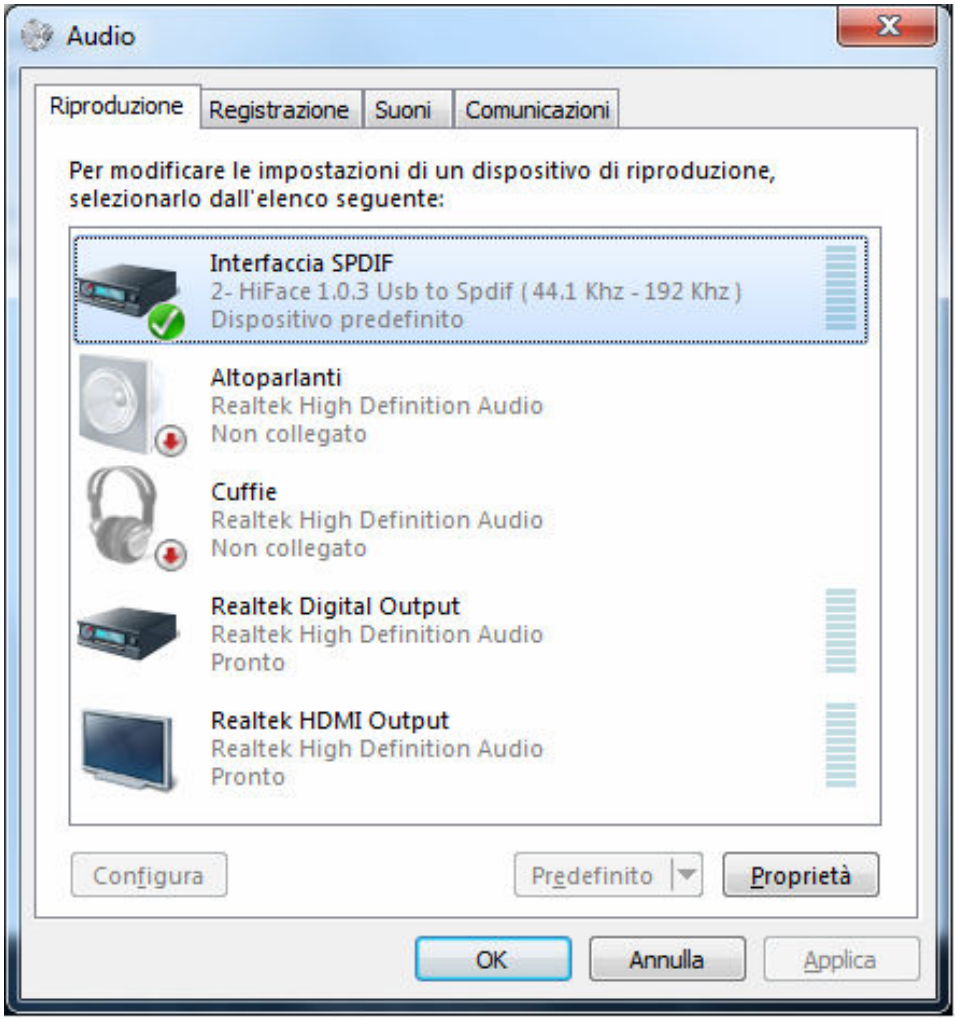

Figure 14

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7.2.2. Configuring for Kernel Streaming with Windows Vista or Windows 7

As for Windows XP, Kernel Streaming has no standard setting in Windows Vista and Windows 7. KS must be selected in the specific player you choose to use.
For example, when using FooBar, with the VAUGHAN connected to the PC and USB input selected, go to the File/Preferences/Playback /Output tab and select “KS: M2Tech 384/32 DAC” as output device. Other players will require different settings (see section 8).

7.2.3. Configuring for WASAPI with Windows Vista or Windows 7

As happens with Kernel Streaming, WASAPI cannot be directly accessed. WASAPI must be selected in the specific player you choose to use.
For example, when using FooBar, with the Young connected to the PC, go to the File/Preferences/Playback /Output tab and select “WASAPI: M2Tech 384/32 DAC” as output device. Other players will require different settings (see section 8).

7.3. Configuring a Mac

Go to System Preferences and select Sounds. The following windows will appear. Select M2Tech 384/32 DAC for output as indicated in Figure 15.

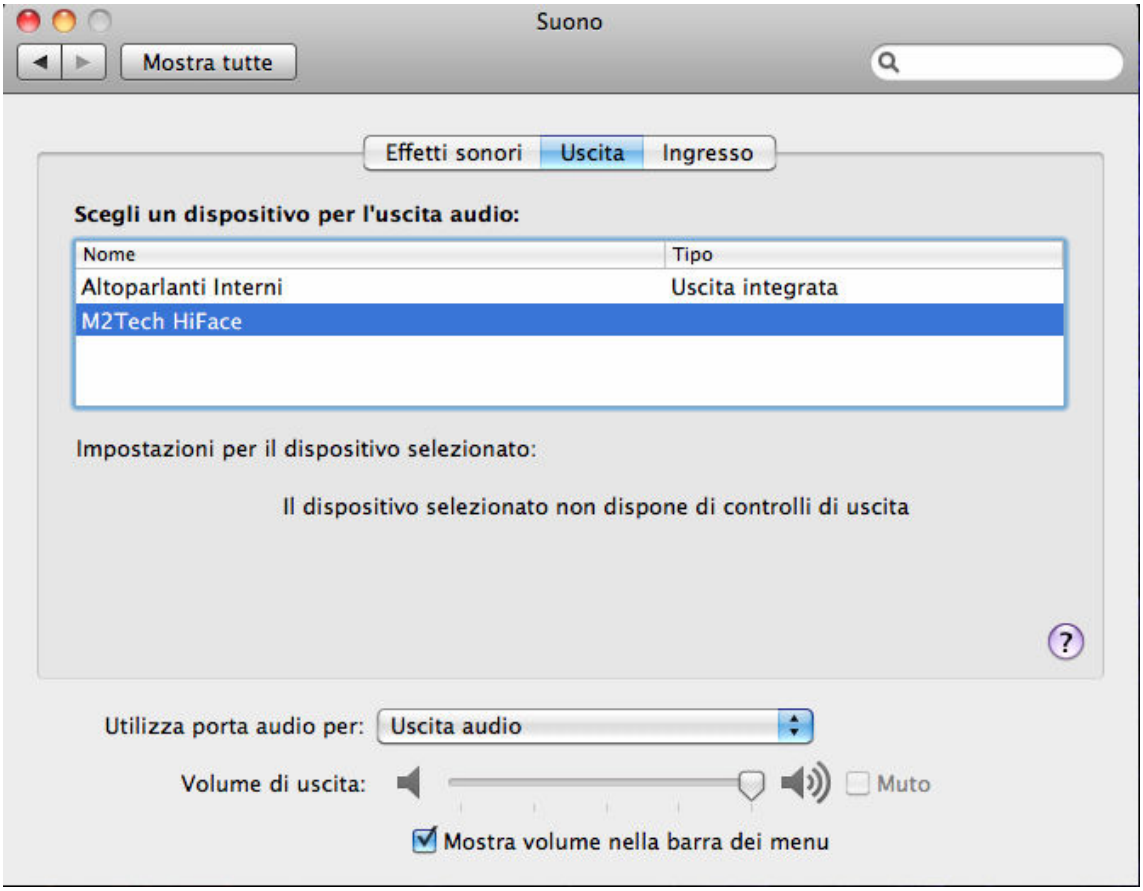

Figure 15

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8. Configuring the player for Kernel Streaming: some examples

8.1. FooBar

To use FooBar in KS mode it is necessary to download the DLL for Kernel Streaming from the FooBar2000 website and install it in the Components sub-folder inside FooBar2000 main folder in your hard disk. The DLL can be found at http://www.foobar2000.org/components/view/foo_out_ks (click on Download). It is a zip folder which contains the DLL. Extract it from the zip and copy to the Components folder. Then, restart FooBar, go to the File/Preferences/Playback/Output window and set parameters as in figure 16.

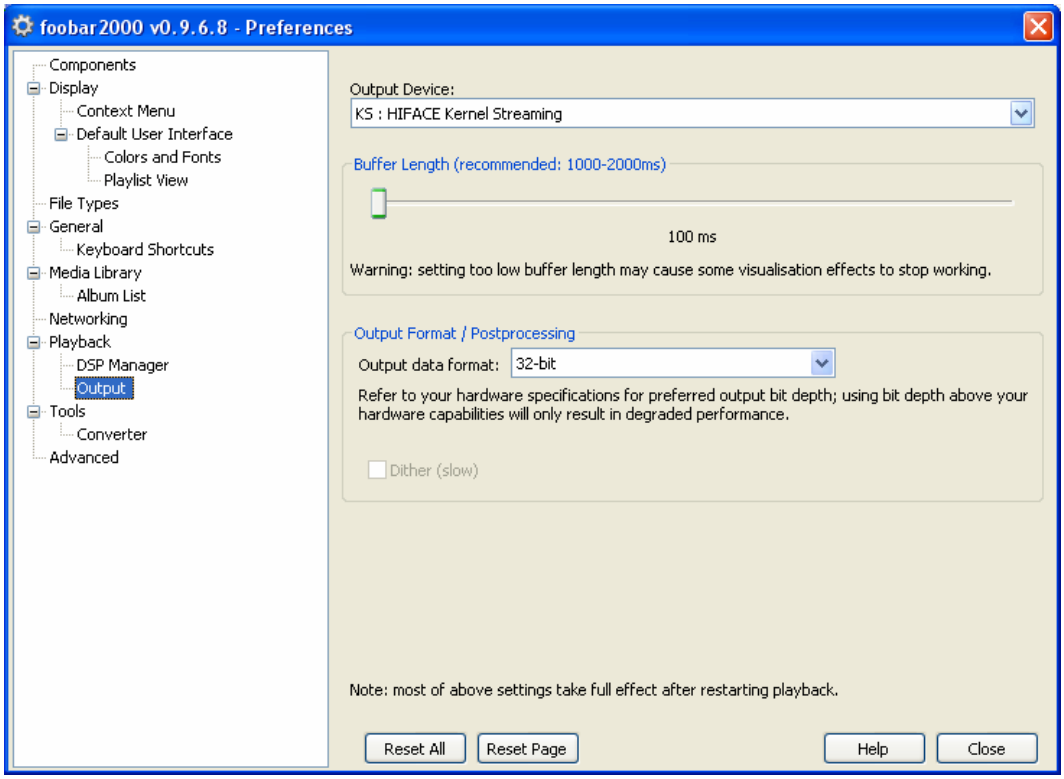

Figure 16

8.2. Winamp and MediaMonkey

These two players are actually the same player with different skins, so they can share the same plug-ins. A freeware plug-in for Kernel Streaming by Steve Monks is available on the Internet (http://www.stevemonks.com/ksplugin/) that can be used to enable Kernel Streaming operation with these players.
Download the zip file, extract the dll file and copy it into the Plugins folder inside Winamp main folder.
With the VAUGHAN connected and USB input selected, right-click on Winamp and select Display/Select Plug-ins. The Preferences window of Winamp will open (see figure 17).

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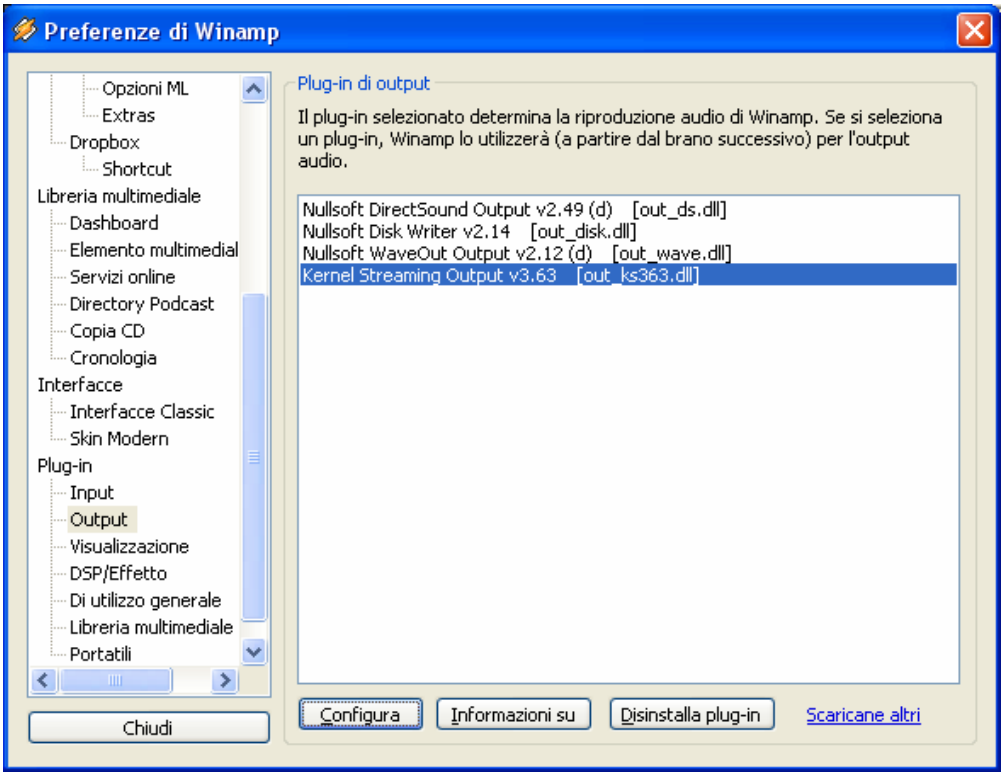

Figure 17

Go to Plug-in/Output and select “Kernel Streaming Output”. Then click on Configure button. Choose YOUNG Kernel Streaming in the output device list (Figure 18).

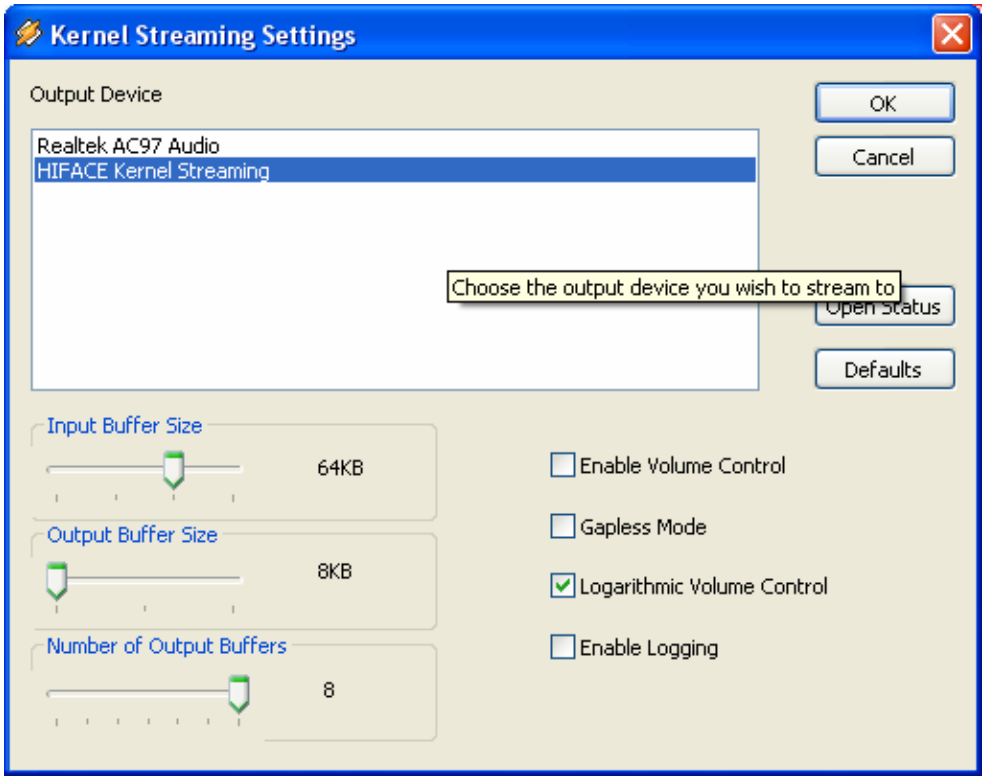

Figure 18

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9. Configuring the player for WASAPI: an example

9.1. FooBar

To use FooBar with WASAPI under Windows 7 it is necessary to download the DLL for WASAPI from the FooBar2000 website and install it in the Components sub-folder inside FooBar2000 main folder in your hard disk. The DLL can be found at http://www.foobar2000.org/components/view/foo_out_wasapi (click on Download). It is a zip folder which contains the DLL. Extract it from the zip and copy to the Components folder.
Then, restart FooBar, go to the File/Preferences/Playback/Output window and set parameters as in figure 19.

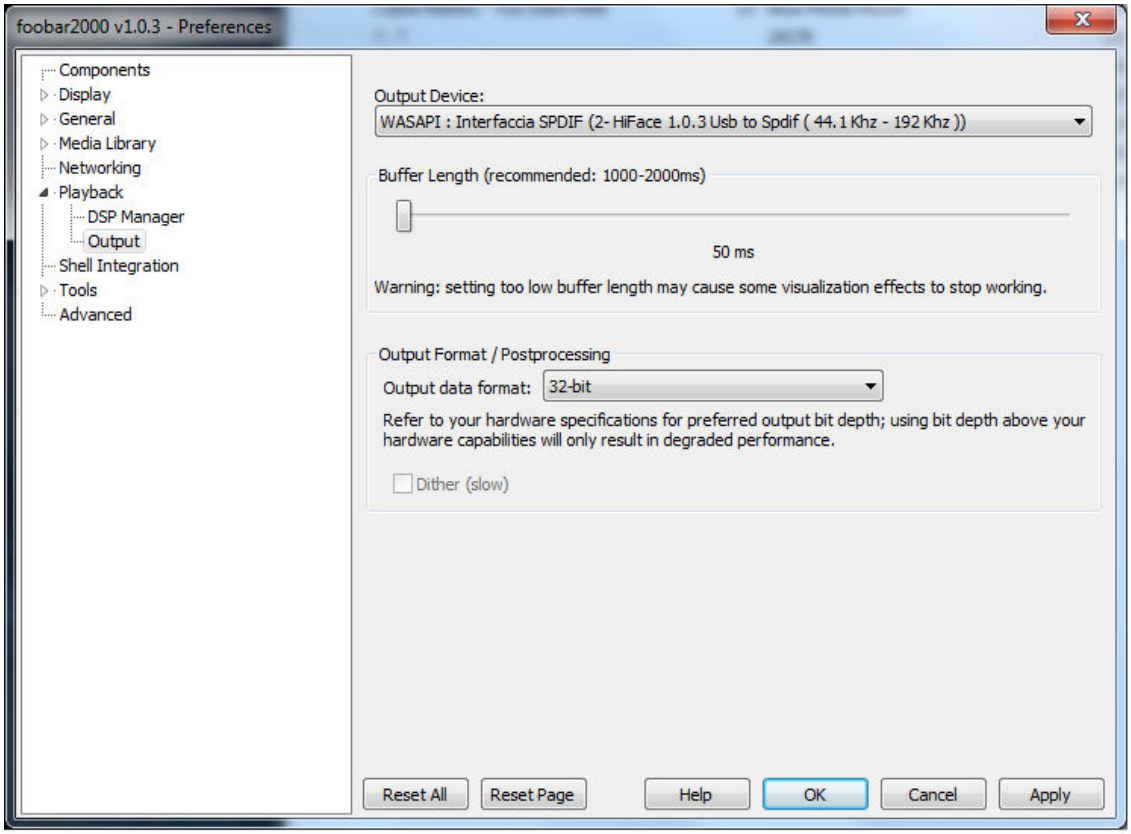

Figure 19

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10. Cleaning the unit

The VAUGHAN should be cleaned with a soft, damp cloth. Do not use alcohol or other cleaning liquids to avoid damaging the unit.

11. Tips on using the USB input

Depending on the PC or Mac being used, it is necessary to first connect and then power up the VAUGHAN or first power up and then connect the VAUGHAN. Please try both ways to see which one fits best to your computer.
Some care must also be used when switching from USB to other inputs and back. In fact, the VAUGHAN's USB interface is shut down whenever the selected input is other than USB, to reduce the noise which can be coupled by the interface to other parts of the circuit when it's not used.
It's strongly recommended to stop the player on the computer before switching to another input or when putting the VAUGHAN in standby, to avoid unwanted behaviour from the computer, like system crash or freezing.

12. Tips on using the I^2S input

The VAUGHAN's I^2S input can be used with digital sources provided with I^2S output, to make an almost jitter-free connection which is better than a normal S/PDIF or AES/EBU connection. This input is galvanically isolated to reduce noise coupling.
This I^2S input accepts raw I^2S data on an RJ-45 socket, compliant to LVCMOS or TTL level (3.3V). Pinout is as follows (pins are listed from left to right):

2,4,6,8) Ground
1) SDATA
3) LRCK
5) SCLK
7) MCLK

Master clock high quality (low jitter) is mandatory in order to obtain the best performance when using this input. In fact, due to the internal circuit structure, the LRCK is NOT used to clock the DAC IC's.

13. External clock input

The external clock input accepts both word clocks and master clocks (please refer to technical specifications, Section 17 on Page 30, for details on the accepted frequencies). A master clock is a high frequency clock (usually 22.5792MHz or 24.576MHz which the unit uses directly to feed all audio digital circuits. A word clock is a sync clock with the

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same frequency as the sample rate of the file or disc being played back. The Vaughan uses the word clock to synthesize its master clock by a dedicated internal circuit. The VAUGHAN automatically recognizes the clock frequency and type
.
Due to the unit's internal structure, external word clocks may not allow for the best performance, while master clocks do. Thus, using a master clock frequency, when available, it's preferred.

14. Stereo and dual mono modes

All S/PDIF and AES/EBU inputs (Toslink™ and ST™ included) can be used as either two separate stereo inputs for sample rates up to 192kHz (96kHz on Toslink™) or a a single dual mono input on two wires for sample rates up to 384kHz (192kHz on Toslink™). Dual mono mode also accommodates some sources which only carry high resolution (192kHz) on two wires. Each input pair can be independently configured to operate in either stereo or dual mono. See details about how to configure the input mode in Section 16.3, Page 30.

15. Power supply, battery and battery charger

The VAUGHAN has a sophisticated power supply based on an universal AC power AC/DC converter, a high quality, high capacity and high surge current LiPo battery and a dedicated battery charger.

The units normally draws its power from the battery and the AC/DC converter is switched off to avoid injecting noise in the audio circuits. A battery charge is sufficient for 4/5 hours listening, depending on various factors like the ageing of the battery, the use of headphones and the selected input.

When the battery is depleted, the system automatically isolates it from the audio circuits and power them by the AC/DC converter (unless "manual" is selected for the power mode, see Section 16.3, page 30), to ensure uninterrupted operation. The converter is also used to provide the current to charge the battery via the dedicated battery charger.

When "manual" is selected for the power mode, the above strategy is inhibited and the battery is used to the full capacity. After it is completely depleted, the system switches itself off, thus isolating the battery to avoid damages due to excessive discharge. Before reaching this point, the system advices the user with messages on the display. User may decide to put the unit in standby, thus manually initiating a charge cycle.

In case of battery or battery charger failures, the user can force the usage of the AC/DC converter to avoid stopping the unit while waiting for servicing or replacement, at the cost of a slightly lower sound quality.

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When planning to keep the unit off for a long time, please charge the battery up to 60% before switching the unit off, to ensure the longest battery life. Also, please consider the battery is subject to ageing, so its capacity can decrease during its life.

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16. Configuration

The VAUGHAN is a versatile unit with many configurable options. Configuration is made by a menu which can be accessed both by the VAUGHAN's front panel or the remote control.

16.1. Navigating the menu by the front panel controls

To access the menu, press the "Menu/Select" button once.
To move from one configuration option to the next one or the previous one, rotate the knob.
To select the desired option, press the "Menu/Select" button again.
To change the value associated with the option, rotate the knob.
To select the displayed value, press "Menu/Select" button. The menu will advance to the following option.
To abort the configuration (that is, to exit the menu without changing the configuration), press the "Escape/Standby/Off" button. Otherwise, just wait a few seconds without selecting the displayed value: the system will automatically abort the configuration.

16.2. Navigating the menu by the remote control

To access the menu, press the "Enter" button once.
To move from one configuration option to the next one or the previous one, press the "arrow up" or "arrow down" buttons.
To change the value associated with the displayed option, press the "arrow up" or "arrow down" buttons.
To select the displayed value, press "Enter" button. The menu will advance to the following option.
To return to the present value of the displayed option, press the "Esc" button"
To abort the configuration (that is, to exit the menu without changing the configuration), press the "Exit" button. Otherwise, just wait a few seconds without selecting the displayed value: the system will automatically abort the configuration.

16.3. Configuration options and values

Input. Allows for choosing the input for playback. Every input pair configured in stereo is listed twice (e.g: RCA_A and RCA_B), while every input pair configured in dual mono is listed only once (e.g: XRL_M). Thus, the input value list can change depending on the input mode configuration of each channel. In case of all stereo inputs, the following value are listed:

- XLR_A
- XLR_B
- BNC_A
- BNC_B

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- RCA_A
- RCA_B
- TOS_A
- TOS_B
- ST_A
- ST_B
- I^2S
- USB

Balance. Allows for setting the left-right balance in 1dB steps. Due to the digital nature of the unit, balance works in attenuation: setting the balance to right means attenuating left, and vice-versa. The maximum value is +/-7dB.

Volume mode. Allows for choosing the way the volume is operated. Three values are available:

- dB (0 = max, -90 = min)
- Steps (180 = max, OFF = min)
- Volume off

The first two options only choose the way volume is displayed. The third choice disables the volume control (recommended when using the VAUGHAN as a source with a preamplifier or an integrated amplifier). Please note that when choosing “Volume off”, the output level is fixed to the last value set before disabling the volume. This is useful when the 0dB volume is too high for your preamplifier.

Input mode. Allows for choosing the input mode for the selected input. Two values are possible:

- 2 channels
- mono

Please note this option doesn’t apply to I^2S and USB inputs.

External clock. Allows for toggling the external clock usage. Two values are possible:

- Off
- On

When “Off” is selected, any external clock applied to the external clock input is ignored. When “On” is selected, the external clock is used to clock the unit when present on the external clock input. Please be sure that the clock is present when starting playback.

Power mode. Allows for choosing the power management strategy. Three values are possible:

- Auto
- AC
- Manual

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"Auto" means that the system automatically recharges the battery when it's nearly depleted (85% capacity used), drawing power from the internal AC/DC for both the battery charger and the audio circuits. When the battery is charged, the system reverts to it, switching the internal AC/DC off. Moreover, a charge is initiated every time the unit is put into standby. This mode ensures the longest life to the battery.

In AC mode, the unit is forced to use the AC/DC converter. This is useful in case of battery failure or absence.

In Manual mode, the units uses the battery down to its complete depletion and then switches off. This is useful when a listening session is in progress and the user doesn't want the unit to switch to the AC/DC which may lower the sound quality compared to the battery supply. This way, the battery usage is a little longer and may allow for completing the listening session.
When the battery discharge reaches 85%, the unit starts indicating it by displaying the battery icon on the display. When depletion goes further on, the battery icon is replaced by the "BAT LOW " indication. In this case, the user may initiate a charge cycle by operating the rear mains switch.

In both Auto and Manual modes, when the units is put into standby during a charge cycle and then reactivated before the charge is terminated, the battery will be selected as power source whenever its charge level is more than 15%.

Info. Displays sensible information about the unit: DAC's configuration and battery charge level.

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17. Technical Specifications

Sampling frequencies: 44.1, 48, 88.2, 96, 176.4*, 192*, 352.8**, 384kHz**
Resolution: ..... 16 to 32 bits***
USB: ..... 2.0 high speed

Clock precision: ..... +/-1.5ppm 0 to 60°C, 0.1ppm typical @ 25°C
External clock frequencies ..... 44.1, 48, 88.2, 96, 176.4, 192, 352.8 and 384kHz, 22.5792 and 24.576MHz
External clock input level 3.3V

S/PDIF input sensitivity: ..... 0.5Vpp +/-0.1V
S/PDIF input impedance: ..... 75 Ohms
AES/EBU input sensitivity: ..... 2Vpp +/- 0.5V
AES/EBU input impedance: ..... 110 Ohms
I^2S input level ..... LVCMOS/TTL (3.3V)

S/PDIF and AES/EBU inputs bit-rate up to 24.576Mbps (up to 384kHz sampling frequency in dual mono mode)
ST inputs bit-rate ..... up to 24.576Mbps (up to 384kHz sampling frequency in dual mono mode)
Toslink™ input bit-rate: ..... up to 15Mbps (up to 192kHz sampling frequency in dual mono mode)
I^2S input bit-rate ..... up to 24.576Mbps (up to 384kHz sampling frequency)

Analog output voltage: ..... $2.65V_{rms}$ @ 0dBFS (single-ended)
$5.3V_{rms}$ @ 0dBFS (balanced)
THD+N: ..... 0.0003% (1kHz @ 0dBFS, 0-22kHz)
S/N ratio: ..... 128dB (A-weighted)

Volume control range ..... 0dB to -90dB, 0.5dB steps
Muting: ..... -20dB
Balance: ..... 0dB to 6dB, 0.5dB steps

Minimal requirements: ..... 1.3GHz CPU clock, 1GB RAM, 2.0 USB port

Supply voltage: ..... $90\text{-}265V_{AC}$, 50-60Hz
Power consumption: 75VA

Battery charge time ..... 4 hours +/- 0.5 hour
Battery duration ..... 5 hours
Battery charge cycles ..... 1000 min. (up to 4000 in auto mode)

Size: ..... 450x90x450mm (w x h x d, cabinet)
450x100x465mm (w x h x d, with connectors and feet)
550x150x550mm (w x h x d, box)

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Weight:..... 9kg (DAC only)
10kg (box)

* Toslink™ inputs in dual mono mode only. Depending on the fiber used and the transmitter's power, 176.4kHz and 192kHz may be achieved with Toslink™ in stereo mode, too, but this feature is not guaranteed.
** all S/PDIF and AES/EBU inputs in dual mono mode except Toslink™. Depending on the fiber used and the transmitter's power, 352.8kHz and 384kHz may be achieved with Toslink™, too, but this feature is not guaranteed.
*** 32 bits are accepted on USB and I2S inputs only. When using WASAPI on USB, resolution is limited to 24bits.

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